WHAT IS CLAIMED IS:

1. An optical filter device comprising:

an optical waveguide layer; and

a filter element including a liquid crystal layer disposed in a position which divides said optical waveguide layer in a waveguide direction, said liquid crystal layer having a twisted structure in which a helical pitch reflects light of a predetermined wavelength.

2. An optical filter device according to claim 1, wherein said filter element is inserted into a groove which is formed in said optical waveguide layer.

3. An optical filter device according to claim 1, wherein said filter element is formed by filling a liquid crystal material before curing into a groove which is formed in said optical waveguide layer, and then curing the liquid crystal material.

4. An optical filter device according to claim 1, wherein said liquid crystal layer is formed by stacking a right-handed twist layer and a left-handed twist layer.

5. An optical filter device according to claim 2, wherein said liquid crystal layer is formed by stacking a right-handed twist layer and a left-handed twist layer.

6. An optical filter device according to claim 3, wherein said liquid crystal layer is formed by stacking a right-handed twist layer and a left-handed twist layer.

7. An optical filter device according to claim 1, wherein said liquid crystal layer has a thickness of 10 to 60 μm.

8. An optical filter device according to claim 2, wherein said liquid crystal layer has a thickness of 10 to 60 μm.

9. An optical filter device according to claim 3, wherein said liquid crystal layer has a thickness of 10 to 60 μm.

10. An optical filter device according to claim 1, wherein said liquid crystal layer is an ultraviolet curing liquid crystal layer.

11. An optical filter device according to claim 10, wherein said liquid crystal layer comprises an ultraviolet curing nematic liquid crystal and a chiral agent.

12. A optical filter device comprising:

a substrate;

an optical waveguide layer on a substrate into which is formed a groove; and

a filter element in said groove, wherein said filter element includes a liquid crystal layer disposed in a position which divides said optical waveguide layer in a waveguide direction, said liquid crystal layer having a twisted structure in which a helical pitch reflects light of a predetermined wavelength.

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13. An optical filter device according to claim 11, further including a photodiode, a laser diode, and a monitor photodiode on the silicon substrate.

14. An optical filter device according to claim 12, wherein said filter element is a single-layer member having a twisted structure in which a helical pitch reflects a specific wavelength.

15. An optical filter device according to claim 12, wherein said filter element is a plural-layer member having a twisted structure in which a helical pitch reflects a specific wavelength.

16. An optical filter device according to claim 12, wherein said waveguide is quartz.

17. An optical filter device according to claim 12, wherein said liquid crystal layer is an ultraviolet curing liquid crystal layer.

18. A method of producing an optical filter element, wherein said filter element includes an ultraviolet curing liquid crystal layer having a twisted structure in which a helical pitch after curing reflects light of a predetermined wavelength, said method comprising:

providing a substrate;

placing a spacer material on a mirror-polished surface of said substrate; and

placing said ultraviolet curing liquid crystal material on said substrate adjacent to said spacer material;

pressing a UV-transparent substrate on said ultraviolet curing liquid crystal material to form a film; and

irradiating said ultraviolet curing liquid crystal material with ultraviolet rays.

19. A method according to claim 18, further comprising cutting said film into a given size; and peeling off from said substrate.

20. A method according to claim 19, wherein said film is cut together with the substrate.

21. A method according to claim 19, further comprising adding an additional layer of liquid crystal film on said film, before said curing step, including adding dropwise additional liquid crystal onto said film.

22. A method of forming an optical filter device, comprising:

providing a substrate;

providing an optical waveguide layer on said substrate and having a groove formed therein;

pouring a liquid crystal material into said groove; and

irradiating said liquid crystal material with ultraviolet rays,

wherein said liquid crystal material exhibits a cholesteric phase whose helical axis is oriented in parallel with the waveguide direction of said optical waveguide layer.